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PHYLLOGOBIUS, A NEW GENERIC NAME FOR *COTTOGOBIUS PLATYCEPHALOPS* SMITH (PISCES: GOBIIDAE), AND A REDESCRIPTION OF THE SPECIES

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ABSTRACT

A new genus, *Phyllogobius* gen. nov., is proposed for *Cottogobius platycephalops* Smith, a species of commensal goby which does not belong in *Pleurosicya* Weber, the senior synonym of *Cottogobius* Koumans. The genus is characterised by an unrestricted gill opening forming a broad free fold across the isthmus, at least half the first gill arch bound by membrane to the opercular wall, and the premaxilla with ascending and articular processes broadly fused together. *P. platycephalops* is a rare species, commensal on flat upright sponges.

KEYWORDS: Gobiidae, taxonomy, *Cottogobius platycephalops*, new genus, *Phyllogobius*, commensal, sponge, *Phyllospongia*.

INTRODUCTION

In 1964, Smith described the Flathead Sponge Goby, *Cottogobius platycephalops* from Pinda, Mozambique. *Cottogobius* Koumans was shown by Larson and Hoese (1980) to be a synonym of *Pleurosicya* Weber, a widespread genus of small gobies commensal with invertebrates. *C. platycephalops* does not fit in *Pleurosicya* or related genera, differing by its unrestricted gill opening with membranes forming a broad fold across the isthmus, wide interorbital with a pair of anterior interorbital pores, and at least half of the first gill arch bound by membrane. A new generic name is required to separate *C. platycephalops* from its, albeit, close relatives. Recent collections on the Great Barrier Reef and the Philippines have produced a few additional specimens of this uncommon goby. All were living commensally on flat-bladed sponges tentatively identified as *Phyllospongia* sp. The fish is redescribed and figured below in the light of the new material although Smith's description is quite comprehensive. Methods of counting and measuring follow those of Larson and Hoese (1980). Counts of the holotype are marked by an asterisk. Type specimens from Rhodes University Institue of Ichthyology, Grahamstown (RUSI) were examined, as were specimens from the Australian Museum, Sydney (AMS), the Northern Territory Museum, Darwin (NTM), and the Royal Ontario Museum, Toronto (ROM).

SYSTEMATICS

Phyllogobius gen. nov.

Type species: *Cottogobius platycephalops* Smith, 1964.

Type material: HOLOTYPE - RUSI 212, 19 mm SL, Pinda, Mozambique. PARATYPES - RUSI 5441, 5 specimens, 17-22 mm SL, collected with holotype.

Additional material. AMS I.21916-001, 3 specimens, 14-18 mm SL, Caban Island, Batangas Province, Philippines; ROM 42636, 11 mm SL, Solomon Islands; AMS I.24847-001, 23.5 mm SL, west face of No Name Reef, NE of Dunk Island, Queensland; NTM S.11404-001, 2 specimens, 17.5-18 mm SL, Rib Reef, Queensland; AMS I.24846-001, 19.5 mm SL, same locality as preceding; NTM S.11962-001, 2 specimens, 15-18 mm SL, Ashmore Reef.

Diagnosis. A small goby with the following combination of characters: fleshy lobes around pelvic spines, and pelvic frenum folded forward into pocket; head and anterior half of body extremely depressed; eyes largely dorsally-placed; interorbital wide, with two anterior interorbital pores present, and thin ridges of bone on either side of interorbital canals; scales 28-37 in lateral series and nape scaled up to behind eyes; gill opening unrestricted, a broad free fold across isthmus; at least half of first gill arch bound to opercle by membrane; outermost fine teeth at sides of lower jaw straight and horizontally-directed in contrast to outer row

of upper jaw teeth which are large, pointed and backwardly-directed.

Osteological characters (based on one specimen only) include: five branchiostegal rays; no dorsal post-cleithrum; ventral post-cleithrum a very small oval; metapterygoid expanded, barely separate from quadrate; sphenotic with narrow pointed flange forming part of posterior edge of orbit; frontal short, with rounded posterior wings and low angled ridge around dorsal and posterior part of orbit with very low ridge running parallel on either side of frontal to accommodate interorbital canal; supraoccipital narrow anteriorly, with short median wings, very low crest posteriorly; premaxilla with ascending and articular processes indistinguishable, fused into single very broad process; maxilla thin, lateral process expanded anterolaterally; glossohyal expanded, spatulate; scapula unossified; vertebrae 10+16 (including urostyle) = 26; dorsal ribs on first ten vertebrae; ventral ribs on vertebrae three to eight; elongate ventral processes of pelvic bones diverge at roughly T-shaped tips; single epural with poorly ossified dorsal flange; upper hypural splint-like; parahypural free, somewhat curved anteriorly.

Phyllogobius platycephalops (Smith), comb. nov.

(Figs 1-3, Table 1)

Cottogobius platycephalops Smith, 1964: 174-176, pl. IV.

Description. First dorsal rays VI*; second dorsal rays I, 8* (I, 7 in 2 specimens); anal rays I, 8*; pectoral rays usually 19* (16 to 20, 18 in holotype); longitudinal scale counts 28-37 (30-35? in holotype, many scales lost posteriorly) transverse scale count backward 9*-13; 10-13 predorsal scales; gillrakers on first arch 2+1+2 or 3; segmented caudal rays 16-17*; branched caudal rays 11*.

Head extremely flattened, increasing in height posteriorly. Body slender, roughly triangular in cross-section anteriorly, compressed posteriorly. Snout long, broad, rounded in dorsal view. Mouth subterminal, upper lip overlapping lower jaw (Fig. 1). Nostrils close together, posterior nearly touching anterior rim of eye. Anterior nostril with short tube. Tongue rounded to blunt. Jaws end at point below mid-eye. Eye moderate, 20-30% of head length (21% in holotype), dorsolaterally oriented. Supraorbital ridge present (enhanced by preservation in holotype), as is low interorbital ridge running longitudinally on side of each interorbital canal. Interorbital width about twice eye diameter. Gill opening unrestricted, membranes somewhat pointed posteriorly, fused together across isthmus and free of it. Membranes attached anterior to eye. At least half of first gill arch bound by membrane to opercle, and about a quarter of second arch bound to first arch. Gill rakers on front of first arch very low stubs without spines, rakers on back of arch with fine spines. Rakers on front of second arch somewhat larger, more numerous, with fine forwardly-directed spines. Scales ctenoid, absent from sides of head, pectoral base, breast, and midline of belly (in 3 specimens, including largest, belly scaled in front of anus). Predorsal scales smaller than body scales, covering nape fully, extending up to behind eyes at a level above or little forward of preopercular edge (Fig. 2). Most nape scales lost in holotype (its rather dehydrated condition made accurate check of scale pockets impossible).

First dorsal fin triangular in outline, height greater than body depth. Second and third spines longest, subequal. Second dorsal about equal to first in height anteriorly, lower posteriorly. Anal fin very low, little over half height of second dorsal. All anal rays unbranched. Pectorals rather pointed, reaching to just above anus, with 7 (6 to 9) lowermost rays unbranched and somewhat thickened distally, as are tips of lowermost branched ray. Pectoral base oriented diagonally so that lowermost pectoral rays are considerably anterior to uppermost rays. Caudal roughly rectangular, margin slightly rounded. Lowermost 5 or 6 caudal rays slightly thickened along ventral margin. Pelvic fin flattened, broad and round, does not reach anus (Fig. 3). Fifth pelvic ray with slender base (not broad, flattened) and branching 5-6 times. Pelvic spines slightly curved inward. Pelvic spine lobes short, flat, not folded or dissected. Frenum folded forward into an anteriorly-facing pocket. Lobes and frenum mostly smooth, with low rounded papillae often present on edges of frenum, spines or surface of lobes.

Three preopercular pores present along deep groove behind preopercle, 2 lowermost

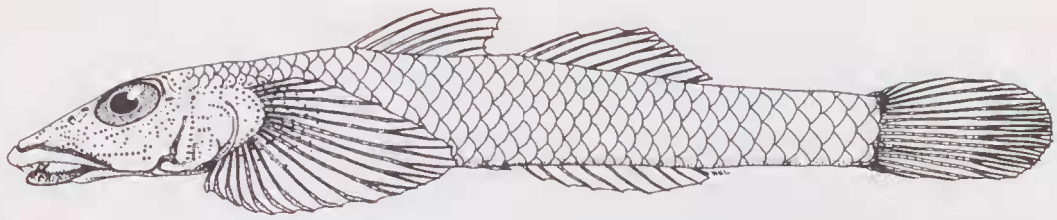

Fig. 1. *Phyllogobius platycephalops*, AMS I.24846-001, from Rib Reef, Queensland, lateral view, 19.5 mm SL.

close together by preopercular angle. Opercle sculptured around groove, with anteriorly-directed lower lobe variably developed (Fig. 1), and shallow groove running up behind vertical opercular papillae row. A nasal pore close to dorsal side of each posterior nostril. Two separate interorbital canals, each with an anterior and posterior interorbital pore (posterior pore just above hind margin of eye). In several specimens, posterior pores united into one median pore linked to the interorbital canal by short canal. A postocular pore behind each eye, an infraorbital pore on each side of head below mid-eye level and a pore just above preopercular canal. All pores connected by lateral line canals.

Sensory papillae on head as in Figs 1 and 2. In all specimens (except those from Philippines and several types) many fine papillae present, scattered evenly over top, sides and underneath head, pectoral base, and lower half of pectoral fin (remainder of types dehydrated). These papillae (which, for clarity, are not shown in Figs 2 and 3) usually slightly smaller than major sensory papillae, and obscure pattern in some specimens.

Teeth in lower jaw with outermost row of uniserial horizontally-directed straight fine teeth (tips slightly curved posteriorly); teeth absent from jaw symphysis. Outermost row separated from inner rows by very narrow gap. One to three irregular inner rows of small curved pointed teeth present, with

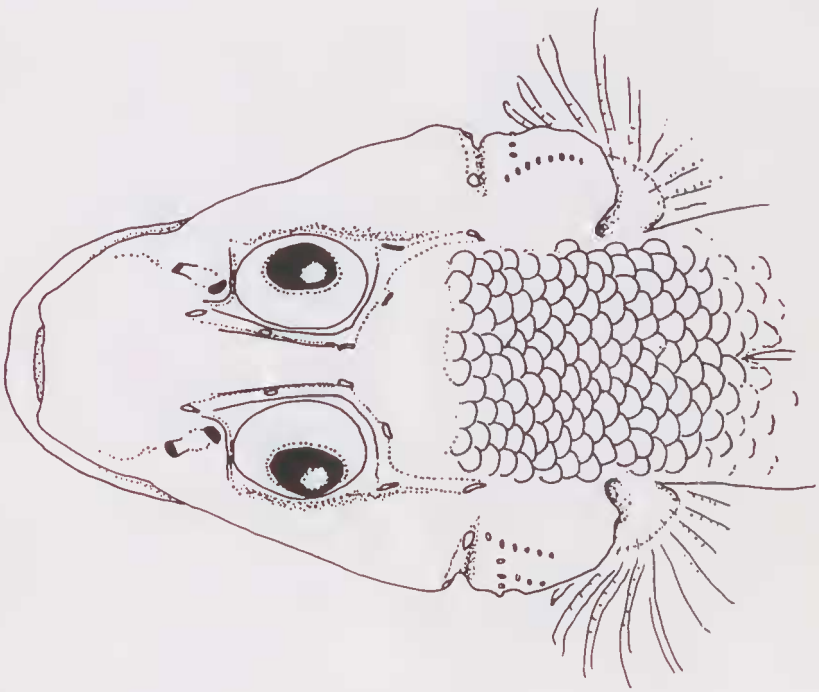

Fig. 2. *Phyllogobius platycephalops*, AMS I.24846-001, dorsal view of head showing headpore pattern and scalation.

innermost even row of slightly larger pointed teeth. On either side of symphysis of jaw, large sharp curved caniniform tooth present, occasionally with smaller such tooth beside it.

Upper jaw with outermost row of about 14 large strongly recurved pointed teeth across front and anterior half of sides of jaw. Points of teeth protrude past upper lip and over lower jaw when mouth closed. Single row of small curved sharp teeth along posterior half of sides of upper jaw. Innermost band of one to three rows of small sharp fine conical teeth around sides and front of jaw. Vomer without teeth, does not protrude from roof of mouth.

Colour in life. Smith's account (1964) states: "In life milky green, the occiput with shiny green spots on an orange red background, similar markings around snout, eyes bright blue". The Rib Reef, Queensland, material was noted as being transparent pink, but no further description was kept. One specimen was transparent with fine crimson chromatophores scattered over head and body, intensified along dorsal fin bases (from a slide of largest Philippines specimen). The pectoral rays and caudal fin rays and membrane are tinged with the same colour. The chromatophores are most dense around the cranium and brain, and also form two curved lines from front of eye to tip of snout, following the contours of the maxilla. The front of the upper lip is densely speckled with fine crimson. Irises are silvery, with crimson and red speckling overlaying most of silver surface, leaving a narrow silver ring around the pupil. No green or blue pigments are observable (Smith's specimens may have come from a very differently-coloured host).

Colour in alcohol. No pigment pattern visible. All preserved specimens are various shades of brownish to creamy-white, depending on preservation.

Comparisons. The five commensal goby genera with lobed pelvic spines are closely related and generally similar in appearance. *Phyllogobius* shares three characters with *Pleurosicya*, the most speciose genus. These are the fine horizontal moveable lower jaw teeth, the scaled nape, and the diverging tips of the pelvic bone anterior processes (the latter is variable in *Pleurosicya*). The head-pore pattern with two separate canals and two anterior interorbital pores present is a character shared by *Phyllogobius*, *Bryaninops* Smith and *Lobulogobius* Koumans.

Phyllogobius has five unique characters not possessed by members of the other four genera. These are: the premaxilla with only one broad low process, the gill membranes joined together forming a fold across the isthmus and free of it, at least half of the lower limb of the first gill arch joined to the opercular wall, low interorbital ridges present on each side of each interorbital canal, and the scattered papillae on the head and pectoral base. None of the other fishes in this group are shaped in such an exaggerated manner. Although this fish shows similarities to several genera, it appears to be most closely related to *Pleurosicya*.

Remarks. The type specimens came from "sandy coral pools at Pinda, Mozambique"; no depth was given. The Queensland and Philippine specimens were collected by hand from foliaceous, flattened, thin, digitate purplish-brown sponges identified as *Phyllospongia/Carteriospongia*, of which a revision of the genus and species are in preparation by P. Bergquist (Hooper, pers. comm.). The present species most resembles *P. papyracea* (Esper) sensu Lendenfeld, 1889, plate 4, figure 2. The sponges are upright, with overlapping flat leaflike blades, growing on sand and rubble bottoms, near rich coral areas at depths of 15 m. *P. platycephalops* has not been found associated with any other invertebrate group so far, and does not seem to be common. *Luposicya lupus* Smith, another commensal goby restricted to sponges, has been collected from the same type of sponge (and locality) as *Phyllogobius*, but the two fish have not been observed on the same individual sponge. *Phyllogobius* has become known as the "Flathead Sponge Goby". Smith (1964) remarked upon its similarity to a juvenile platycephalid.

Etymology. From the Greek "phyllon", meaning leaf, referring to the extremely depressed head and body of the type species. This also echoes the name of the host sponge.

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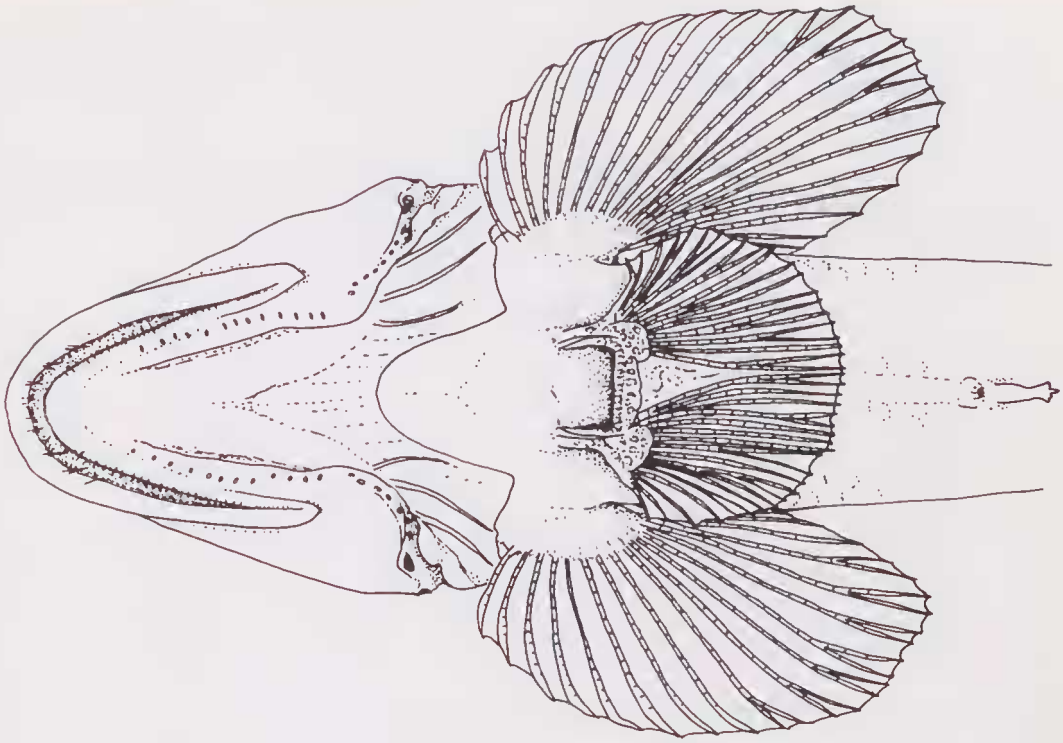

Fig. 3. *Phyllogobius platycephalops*, AMS I.24846-001, ventral view of head showing pelvic fin structure, main sensory papillae and gill membrane shape.

Table 1. Counts and measurements (in mm) of *Phyllogobius platycephalops*

	Holotype RUSI 212	*Paratypes RUSI 5441*					*AMS I.24847-001*	*NTM S.11404-001*		*AMS I.24846-001*		*AMS I.21016-001*	
	♂	♂	♂	♂	♀	♂	♂	♂	♀	♂	♂	♀	♀
Standard length	19	22	20	20	19.5	17	23.5	18	17.5	19.5	18	14	14
First dorsal	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI
Second dorsal	1,8	1,7	1,8	1,8	1,8	1,8	1,7	1,8	1,8	1,8	1,8	1,8	1,8
Anal	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8
Pectoral	18	16	19	19	19	19	19	19	18	19	18	20	18
Longitudinal scales	30-35?	35	37	—	—	34?	36?	28	29	28	—	—	—
Transverse scale backward	9	9	13	11?	10?	10?	9?	9	10	9	—	—	—
Head length	6.6	6.5	6.0	5.9	5.8	5.3	7.7	5.6	5.8	6.3	6.1	5.0	4.9
Head depth	2.1	3.0	2.6	2.3	2.7	1.9	3.0	2.0	2.0	2.2	2.0	1.9	1.8
Head width	4.3	5.2	4.7	4.3	4.5	3.3	5.3	4.0	4.0	4.9	4.4	3.2	3.4
Body depth at anus	3.7	3.2	2.8	2.8	2.7	1.8	3.1	2.1	2.1	2.2	2.0	1.8	1.8
Caudal length	3.7	—	—	4.1	4.4	3.7	5.2	4.0	4.0	4.0	4.0	3.2	3.4
Pectoral length	4.0	4.6	4.1	4.1	4.1	3.3	5.0	3.3	3.0	3.8	3.2	2.9	3.0
Pelvic length	3.9	4.3	3.8	3.7	3.8	3.2	4.0	3.2	2.8	3.2	3.0	2.8	3.0
Caudal peduncle length	3.9	4.7	4.3	4.8	4.3	3.6	4.9	3.8	3.5	4.2	3.7	3.4	2.8
Caudal peduncle depth	1.5	1.9	1.7	1.5	1.5	1.4	2.1	1.7	1.7	1.8	1.6	1.0	1.0
Snout length	2.4	2.3	2.3	2.3	2.3	2.1	3.1	2.5	2.5	2.7	2.3	2.1	2.0
Eye width	1.4	1.5	1.5	1.3	1.3	1.2	1.6	1.4	1.5	1.6	1.6	1.0	1.0
Mouth length	3.3	3.4	3.3	3.3	3.3	2.9	4.2	3.0	3.0	3.6	3.1	2.6	2.8
Interorbital width	0.7	0.8	0.8	0.8	0.7	0.7	0.9	0.9	0.8	0.9	0.9	0.8	0.6

types of *Cottogobius platycephalops*. Dr Doug Hoese of AMS collected the specimens from the Philippines and No Name Reef, Queensland. Doug also lent me his photographs of the Philippine specimens, without which there would have been no fresh colour description. Mr John Hooper of NTM provided information on sponges and their taxonomic problems.

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